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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|---|---|---|---|
| 10/849,724 | 05/20/2004 | Tetsuya Takiguchi | JP920030128US1 | 8657 |

7590 06/04/2008

On behalf of IBM CORPORATION
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| EXAMINER | |
|---|---|
| VO, HUYEN X | |

| ART UNIT | PAPER NUMBER |
|---|---|
| 2626 | |

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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/849,724 | TAKIGUCHI ET AL. | |
| | Examiner | Art Unit | |
| | HUYEN X. VO | 2626 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *28 March 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-12* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-12* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *20 May 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Komori et al. (US 5956679) in view of Takiguchi et al. (IEEE Publication).

3. Regarding claims 1, 7, and 12, Komori et al. disclose a speech recognition device, method, program, and computer-readable medium configured to include a computer, the speech recognition device comprising:

a storage area for storing a feature quantity acquired from a speech signal for each frame (*sound analysis section 102 in figure 2 inherently includes a buffer memory for temporarily storing the received speech signal for processing*);

storing portions for storing acoustic model data and language model data, respectively (*referring to elements 203 and 105 in figure 1, speech HMM 4; language model or grammar or dictionary*);

an echo adaptation model generating portion for generating echo model data from a speech signal acquired immediately prior to a current speech signal to be processed at the current time point and using the speech model data to generate adapted acoustic model data (*noise HMM 202 is created from noise interval locally to*

*the speech interval (col. 5, lines 49-57 and figure 2; echo can be environmental echo, which is noise; the noise HMM is combined with speech HMM 203 in figure 1*); and

recognition processing means for utilizing said feature quantity, said adapted acoustic model data and said language model data to provide a speech recognition result of the speech signal (*figure 2*).

Komori et al. fail to specifically disclose that the echo is an "echo speech". However, Takiguchi et al. teach "echo speech" (*page 128, left column, "reverberant speech"*).

Since Komori et al. and Takiguchi et al. are analogous art because they are from the same field of endeavors, it would have been obvious to one of ordinary skill in the art at the time of invention to modify Komori et al. by incorporating the teaching of Takiguchi et al. in order to improve speech recognition accuracy.

4. Regarding claims 2, Komori et al. further disclose the speech recognition device according to claim 1, wherein said adapted acoustic model generating means comprises: a model data area transforming portion for transforming cepstrum acoustic model data into linear spectrum acoustic model data (*figure 7, transformation form HMM to linear*); and an echo prediction coefficient calculating portion for adding said echo speech model data to said linear spectrum acoustic model data to generate an echo prediction coefficient giving the maximum likelihood (*figure 7*).

5. Regarding claim 3, Komori et al. further disclose the speech recognition device according to claim 2, further comprising: an adding portion for generating echo speech model data (*referring to figure 7*); wherein said adding portion adds the cepstrum acoustic model data of said acoustic model and cepstrum acoustic model data of an intra-frame transfer characteristic to generate a speech model affected by intra-frame echo influence (*referring to figure 7*).

6. Regarding claim 4, Komori et al. further disclose the speech recognition device according to claim 3, wherein said adding portion inputs said generated speech model affected by intra-frame echo influence into said model data area transforming portion and causes said model data area transforming portion to generate linear spectrum acoustic model data of said speech model affected by intra-frame echo influence (*referring to figure 7*).

7. Regarding claim 5, Komori et al. further disclose the speech recognition device according to claim 4, wherein said echo prediction coefficient calculating portion uses at least one phoneme acquired from an inputted speech signal and said echo speech model data to maximize likelihood of the echo prediction coefficient based on linear spectrum speech model data (*referring to figure 7*).

8. Regarding claim 6, Komori et al. further disclose the speech recognition device according to claim 5, performing speech recognition using a hidden Markov model (*referring to figure 2*).

9. Regarding claims 8-11, Komori et al. further disclose the subject matters claimed in claims 8-11 (*referring to claims 2-6*).

## ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to HUYEN X. VO whose telephone number is (571)272-7631. The examiner can normally be reached on M-F, 9-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Edouard can be reached on 571-272-7603. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Huyen X Vo/ 6/3/2008
Primary Examiner, Art Unit 2626

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